

BYKOV, V.Kh.; KRASKOVSKIY, Ye.Ya.

Method for determining the adhesion factor. Dokl. AN Uz.SSR. no.11:  
17-20 '56. (MIRA 13:6)

1. Tashkentskiy institut inzhenerov zheleznodorozhnogo transporta.  
Predstavleno akad. AN UzSSR S.U. Umarovym.  
(Locomotives)

SOV/124-58-11-12159

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 11, p 27 (USSR)

AUTHORS: Panskiy, V.M., Bykov, V. Kh.

TITLE: Redistribution of the Loads Exerted by Locomotive Wheel Pairs onto the Rails Through the Action of a Weight Augmenter on the Front Drivers (Pereraspredeleniye nagruzok ot kolesnykh par lokomotiva na rel'sy pri deystvii perednego uvelichitelya stsepnogo vesa)

PERIODICAL: Sb. nauchn. tr. Tashkentsk. in-t inzh. zh.-d. trans., 1957, Nr 7, pp 81-105

ABSTRACT: On the basis of their analysis of the spring suspension of a locomotive and of the steam-pressure forces generated in the course of its operation the authors determine the amount of load exerted by the locomotive wheel pairs on the rails. They show that, when a driver-weight augmenter is installed (a design for which they have worked out), the resultant load removal from the auxiliary leading truck causes an added load to be placed on the forward driver wheel-pair assembly, at the same time lightening the load on the rear driver wheel-pair assembly. The tests conducted have established that

Card 1/2

SOV/124-58-11-12159

Redistribution of the Loads Exerted by Locomotive Wheel Pairs (cont.)

rails can increase the tractive force of 1-5-0 type locomotives (U. S. usage:  
2-10-0; Transl. Ed. Note) by 3.8 tons.

K. S. Kolesnikov

Card 2/2

KRASKOVSKIY, Ye.Ye., kand.tekhn.nauk (Leningrad); BYKOV, V.Kh., kand.  
tekhn.nauk (Tashkent)

Equipping steam locomotives with adhesion weight augmenters.  
Zhel. dor. transp. 40: no.9:73 S '58. (MIRA 11:10)  
(Locomotives)

AUTHOR: Askinazi, G.B. and Bykov, V.L. SOV-19-58-4-168/523

TITLE: A Method for Determining the Transmission Factors of Electrical Signals Under Dynamic Operating Conditions (Sposob opredeleniya koefitsientov peredachi elektricheskikh signalov v dinamicheskom rezime)

PERIODICAL: Byulleten' izobreteniy, 1958, Nr 4, p 44 (USSR)

ABSTRACT: Class 21c, 36<sup>01</sup>. Nr 112251 (569503, 22 Mar 1957). Submitted to the Committee for Inventions and Discoveries at the USSR Council of Ministers. The method is used for an automatic and continuous determination of the transmission factor at different frequencies.

Card 1/1

BYKOV, V.L.; ZIMIN, A.P., red.

[Collection of problems on the theory of mechanisms and machines] Sbornik zadach po teorii mekhanizmov i mashin . Sverdlovsk, Sverdlovskii gornyi insitut im. V.V.Vakhrusheva. Pt.1. 1964. 93 p. (MIRA 18:1)

9(6)


S/019/59/000/23/153/432  
D046/D005

AUTHORS: Askinazi, G.B. and Bykov, V.L.

TITLE: A Device for Automatic Control of Frequency Characteristics  
in Broadcasting Channels under Dynamic Conditions.

PERIODICAL: Byulleten' izobreteniy, 1959, Nr 23, p 34 (USSR)

ABSTRACT: Class 21e, 36<sub>03</sub>. Nr 124541 (624120/26 of 3 April 1959). In  
the above device the control is effected by determining the  
transfer factor of a radio installation with various frequen-  
cies, using division of the output signal by the input sig-  
nal. An electronic commutator is used for switching the de-  
vice to the inlet or to the outlet of the controlled channel,  
including a photorelay indicating irregularities in the fre-  
quency characteristic. To simplify the circuit and to reduce  
additional distortions in the controlled channel, a hetero-  
dyne band elimination filter is used, with a heterodyne of  
smooth frequency variation and with a quartz filter, the




Card 1/2

S/019/59/000/23/153/432  
D046/D005

A Device for Automatic Control of Frequency Characteristics in Broadcasting Channels under Dynamic Conditions

transmission band of which is synchronous with heterodyne frequency. For dividing the sequence of the pulses at the outlet of the quartz filter, a logarithmic element is used, consisting of a bridge made of resistances and of cuprous oxide valves. To separate the oscillating component of the logarithm difference, an RC-filter is used tuned in the frequency commutation.



Card 2/2



BYKOV, V.L.

Threshold in frequency modulation and methods for reducing it.  
Elektrosvyaz' 18 no.12:22-34 D '64. (MIRA 18:1)

VASIL'YEV, V.G.; IVANOV, A.P.; VOSTRYAKOV, O.I.; SHMITEL'SKIY, V.N.;  
GAFANOVICH, M.D.; DIDENKO, K.I.; ABUGOV, Yu.O.; SHRAMKO, K.N.;  
ZAGARIY, G.I.; DUDCHENKO-DUDKO, V.M.; NIKULIN, Yu.Ya.;  
YEFIMOV, Yu.N.; BYKOV, V.L.

Inventions. Avt. i prib. no.4:73-74 O-D '64 (MIRA 18:2)

~ 1 65295-65 EWT(d)/EWT(1)/FS(v)-3/FS3-2 TT/AST/DW

ACCESSION NR: AP5021255

UR/0293/65/003/004/0618/0629  
629.195.2:621.39

AUTHORS: Getmantsev, G. G.<sup>44</sup>; Kalashnikov, N. I.<sup>44</sup>; Bykov, V. I.<sup>44</sup>; Benediktov, Ye. A.<sup>44</sup>;  
Yerukhinov, E. M.<sup>44</sup>; Belikov, V. V.<sup>44</sup>; Bakhtin, V. M.<sup>44</sup>; Kantor, L. Ya.<sup>44</sup>; Korobkov,  
Yu. S.<sup>44</sup>; Kunilov, M. V.<sup>44</sup>; Mityakov, N. A.<sup>44</sup>; Puzyrev, I. M.<sup>44</sup>; Rapoport, V. O.<sup>44</sup>; Sigalov,  
A. G.<sup>44</sup>; Cherepovitskiy, V. A.<sup>44</sup>; Akin, E. A.<sup>44</sup>

TITLE: The results of an experiment on radio communications via "Echo 2" and the moon at a frequency of 162.4 megacycles between the observatories of Jodrell Bank and Zimenki

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 4, 1965, 618-629

TOPIC TAGS: moon, satellite communication, radio telescope, radio transmission, satellite tracking, scientific research coordination / Jodrell Bank radio telescope, Zimenki observatory radio telescope, BESM 2 electronic computer

ABSTRACT: During February-March 1964 the Academy of Sciences of the SSSR, NASA of the USA, and the General Post Office Department of Great Britain conducted an experiment to establish one-way radio communication at 162.4 megacycles via the passive satellite "Echo-2" and the moon. Echo-2 was used for 34 communication

Card 1/2

L 65295-65

ACCESSION NR: AP5021255

6

tests of 10-15 minutes (the time interval permitted by Echo's orbit), and the moon was used for 15 test runs between the Echo tests. The transmitting equipment at Jodrell Bank and the receiving unit of the Zimenki Observatory are described in detail. Echo orbit information furnished by NASA, visual observations, and radio tracking data from fixed stations were fed to a BESM-2 electronic calculator which provided programmed tracking control. The received signal exhibited strong fluctuations separable into two periods: 1) a 1-2 minute fluctuation associated with Echo-2 distortion from a sphere and with tracking errors; 2) a 3-10 second period associated with small surface irregularities. The rapid fluctuations varied with each test. Voice signals, slowed by a factor of 8, were barely intelligible. Telegraph, teletype, and photofacsimile transmission, in general, were unsatisfactory, but in periods of high signal-to-noise ratios intelligible messages were received. The moon transmissions were not as clear but did furnish scientific information. Unexpected transmission losses included 3-5 db for polarization losses and 1-2 db for unknown causes. The international cooperation was excellent, with the Soviet submitting a complete report. Offers for further cooperation have been extended. (Orig. art. has: 3 tables, 7 figures, and 4 formulas.

ASSOCIATION: none

SUBMITTED: 18Apr65

NO REF SOV: 000

Card 2/274

ENCL: 00

OTHER: 002

SUB CODE: AA, EC

L 20971-66 EWT(d)/FSS-2/EWT(1)/EEG(k)-2 AST/TT/GW

ACCESSION NR: AP5018025

UR/0106/65/000/007/0025/0030  
621.372.553

19  
16  
15

AUTHOR: Kalashnikov, N. I.; Kantor, L. Ya.; Bykov, V. L.

TITLE: International experimental radio communication via a satellite and the Moon

4

SOURCE: Elektrosvyaz', no. 7, 1965, 25-30

TOPIC TAGS: satellite communication

ABSTRACT: During the period 21 Feb - 8 Mar 64, experiments with radio communication between Jodrell Bank Observatory near Manchester, England, and Zimenki Observatory near Gor'kiy, SSSR, via the USA "Echo-2" passive satellite (34 sessions) and via the Moon (10 sessions) were conducted. From Jodrell to Zimenki, cw, 400-cps AM, start-stop telegraph, Morse telegraph, facsimile, and time-stretched speech signals were transmitted. The Jodrell 1-kw 162.4-mc transmitter operated with a parabolic 76-m diameter, 40-db gain 1.8° angle

Card 1/2

L 20971-66

ACCESSION NR: AP5018025

3

antenna. At Zimenki, the signals were received by a 15-m diameter 9° angle antenna (a block diagram of the receiver is shown). Photo records of the received signals reveal large slow (1—2 min) and fast (3—10 sec) fluctuations. The distribution of levels was close to the Rayleigh law. Because of the fluctuations, no reception of start-stop telegraph signals was possible. Morse signals at a rate of 60—100 characters/min were received correctly, as well as 8-times-delayed speech signals. Only large-detail facsimile transmission proved possible. The signals via the Moon were of lower quality. "The authors wish to thank G. G. Getmantsev, Ye. A. Benediktov, and N. A. Mityakov for good scientific organization of the experiment." Orig. art. has: 7 figures and 3 formulas.

ASSOCIATION: none

SUBMITTED: 10Oct64

ENCL: 00

SUB CODE: EC, SV, NA

NO REF SOV: 001

OTHER: 000

Cord 2/2 7/9 S

L 8955-66 EWT(d)

ACC NR: AP5026497

SOURCE CODE: UR/0286/65/000/019/0027/0027

AUTHORS: Kantor, L. Ya.; Bykov, V. L.

ORG: none

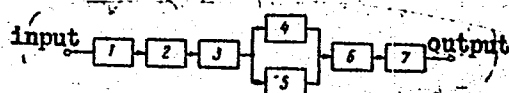
TITLE: Method for decreasing the interference-free threshold of wide-band frequency- and phase-modulated receivers. Class 21, No. 175089

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 19, 1965, 27

TOPIC TAGS: fm receiver, phase modulation, interference reduction

ABSTRACT: This Author Certificate presents a method for decreasing the interference-free threshold of wide-band frequency- and phase-modulated receivers, consisting of a relative increase of the carrier signal level occurring after preliminary conversion of the wide-band signal into a narrow-band signal. To simplify the receiving device, the converted narrow-band signal is fed to two parallel filters (see Fig. 1).

Fig. 1. 1 - Mixer; 2 - intermediate frequency amplifier; 3 - converter; 4 - narrow-band filter; 5 - wide-band filter; 6 - limiter; 7 - frequency attenuator.



Card 1/2

UDC: 621.396.62:621.396.669

L 8955-66

ACC NR: AP5026497

The narrow-band filter passes the carrier and attenuates the side frequencies. The wide-band filter attenuates uniformly the whole spectrum of the narrow-band FM or PM signal. Orig. art. has: 1 diagram.

SUB CODE: 09/ SUBM DATE: 13Mar63

BVK  
Card 2/2



BYKOV, V.L.

Improvement of the threshold characteristics of a FM receiver  
using frequency dividers. Elektrosviaz' 19 no.10:18-25 0 '65.  
(MIRA 18:12)

1. Submitted Febr. 12, 1965.

BYKOV, V.M., kand.tekhn.nauk

Accounting for amortization deductions in determining  
the economic efficiency of capital investments. Teploenergetika  
9 no.11:88 N '62. (MIRA 15:10)

1. Chelyabinskiy politekhnicheskiy institut.  
(Capital investments--Accounting)

ERENBURG, E.E., kandidat tekhnicheskikh nauk; BYKOV, V.M., inzhener.

[Pipe casting] Truboliteinoe proizvodstvo. Izd.3., perer.i dop. Moskva,  
Gos.nauchno-tekhn.izd-vo lit-ry po cherno i tsvetnoi metallurgii, 1953.  
411 p.

(MLRa 6:7)  
(Iron-founding)

Bykov, V.M.

SOV/124-58-5-5346 D

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 5, p 55 (USSR)

AUTHOR: Bykov, V.M.

TITLE: Hydrodynamic Analysis of Stream-flow Plan-view Divergence  
Applied to Hydroelectric Power-plant Design (Gidravlicheskiy  
analiz raschireniya potoka v plane primenitel'no k sooru-  
zheniyam GES)

ABSTRACT: Bibliographic entry on the author's dissertation for the de-  
gree of Candidate of Technical Sciences, presented to the Mosk.  
energ. in-t (Moscow Power Institute), Moscow, 1957

ASSOCIATION: Mosk. energ. in-t (Moscow Power Institute) Moscow

1. Power plants--Design 2. Inland waterways--Hydrodynamic  
characteristics

Card 1/1

BYKOV, V.M.

Planned widening of streams of the tail water of hydraulic structures.  
Trudy MEI no.29:31-50 '57. (MIRA 13:3)  
(Hydraulic engineering)

BYKOV, V.M.

Some applications of the equation of speed distribution within  
the limits of the section of stream widening. Trudy MEI no.29:  
73-86 '57. (MIRA 13:3)

(Hydraulic engineering)

BYKOV, V.M.

Calculating the length of the initial zone of a plane jet  
expanding in a limited space. Nauch. dokl. vys. shkoly; energ.  
no.1:129-134 '58. (MIRA 11:10)

1.Moskovskiy energeticheskiy institut.  
(Fluid mechanics)

BYKOV, Y. M.

Determining the discharge circulating in a straight branch of a  
vortex in a section where the flow is widening. Nauch. dokl.  
vys. shkoly; energ. no.2:129-136 '58. (MIRA 11:11)  
(Hydrodynamics)



BYKOV, V. M.: Master Tech Sci (diss) -- "Problems of the technical-economic basis for the long range development of large KES (hydroelectric stations?)". Leningrad, 1958. 16 pp (Min Higher Educ USSR, Leningrad Polytech Inst im M. I. Kalinin), 150 copies (KL, No 6, 1959, 132)

BYKOV, V.M., insh,

Effect of fuel cost on the economic expediency of power increase  
in the units and increase of steam parameters of the heat  
generating cycle in condensing electric power plants.

Energomashinostroenie 4 no.10:11-12 0 '58. (MIRA 11:11)  
(Electric power plants)

BYKOV, V.M., inzh.

Effect of the steam-main circuit in steam-condensing power stations  
on the amount of power reserve in power systems. Izv. vys. ucheb.  
zav.; energ. no.7:107-113 J1 '58. (MIRA 11:10)

1. Leningradskiy politekhnicheskii institut imeni M.I. Kalinina.  
(Electric engineering)

OFITSEROV, A.S., doktor tekhn.nauk; BYKOV, V.M., kand.tekhn.nauk, red.;  
SAFONOV, P.V., red.izd-va; TEMKINA, Ye.B., tekhn.red.

[Secondary currents] Vtorichnye techenia. Moskva, Gos.izd-vo  
lit-ry po stroit., arkhitekt. i stroit.materialam, 1959. 162 p.  
(MIRA 12:12)

(Hydrodynamics)

BYKOV, V.M., inzh.

Technical and economic basis for increasing the power of  
units and raising the ratings of the heat-power cycle of  
condensation electric stations. Izv.vys.ucheb.zav.; energ.  
2 no.8:121-129 Ag '59. (MIRA 13:2)

1. Chelyabinskiy politekhnicheskiy institut. Predstavlena  
kafedroy ekonomiki i organizatsii energetiki.  
(Electric power plants)

BYKOV, V.M.

Contemporary state and methods for calculating the length  
of whirlpool zones in the widening portion of the stream.  
Nauch.dokl.vys.shkoly; energ. no.2:161-166 '59.  
(MIRA 13:1)

1. Moskovskiy energeticheskiy institut.  
(Dams)

TSIKLAURI, D.S., dotsent, kand.tekhn.nauk; BYKOV, V.M., kand.tekhn.nauk,  
red.; VINOGRADOVA, G.M., red.izd-va; BOROVNEV, N.K., tekhn.red.

[Hydraulic compressors] Gidrokompresory. Moskva, Gos.izd-vo  
lit-ry po stroit., arkhitekt. i stroit.materialam, 1960. 70 p.  
(MIRA 13:6)

(Compressors)

MOSHININ, L.F., doktor tekhn. nauk; TIMOFEEVA, Ye.T., kand. tekhn. nauk;  
BYKOV, V.M., nauchnyy red.; SAFONOV, P.V., red. izd-va; RYAZANOV,  
P.Ye., tekhn. red.

[Instructions on the protection of water from water hammer pipes]  
Ukazaniia po zashchite vodovodov ot gidravlicheskogo udara. Mo-  
skva, Gos. izd-vo lit-ry po stroit., arkhitekt. i stroit. materialam,  
1961. 225 p. (MIRA 14:9)

1. Moscow. Vsesoyuznyy nauchno-issledovatel'skiy institut vodosnab-  
zheniya, kanalizatsii, digrotekhnicheskikh sooruzhenii i inzhenernoy  
gidrogeologii.

(Water hammer)

(Water pipes)



BYKOV, V.M., kand.tekhn.nauk; ZYKIN, F.A., kand.tekhn.nauk;  
USHAKOV, I.M., kand.tekhn.nauk

Device for measuring the total power losses in the model of  
an a.c. network. Izv. vys. ucheb. zav.; energ. 5 no.1:37-42  
Ja '62. (MIRA 15:2)

1. Chelyabinskiy politekhnicheskii institut. Predstavlena  
kafedrami elektricheskikh stantsiy, setey i sistem; teoreticheskikh  
osnov elektrotekhniki; ekonomiki promyshlennosti i organizatsii  
proizvodstva.

(Electric power distribution)

(Electric network analyzers)

KORNEICHEV, A.I., inzh.; BYKOV, V.M., kand.tekhn.nauk

Determining the optimum value of the heating coefficient for heat  
and electric power plants. Teploenergetika 9 no.5:28-31 My  
'62. (MIRA 15:4)

1. Chelyabinskiy politekhnicheskii institut.  
(Heating from central stations)  
(Electric power plants--Equipment and supplies)

MIKHAYLOV, N. V., prof.; BYKOV, V. M., inzh.; SOKOLOV, A. N., inzh.

Ties made with sand concrete. Put' 1 put. khoz. 6 no.10:14-16  
'62. (MIRA 15:10)

(Railroads—Ties, Concrete)

KORNEICHEV, A.I., inzh.; BYKOV, V.M., kand.tekhn.nauk

Economic expediency of the construction of two types of thermal electric power plants. Izv. vys. ucheb. zav.; energ. 6 no 4: 59-63 Ap '63. (MI<sup>4</sup>A 16:5)

1. Chelyabinskiy politekhnicheskiy institut. Predstavlena kafedroy ekonomiki promyshlennosti i organizatsii proizvodstva. (Electric power plants)

KORNEICHEV, A.I., inzh.; BYKOV, V.M., kand.tekhn.nauk

Technical and economic basis for the calculational value of heating  
coefficient in the design of thermal electric power plants.  
Teploenergetika 10 no.2:60-63 F '63. (MIRA 16:2)

1. Moskovskiy energeticheskiy institut (for Korneichev).
2. Chelyabinskiy politekhnicheskiy institut (for Bykov).  
(Electric power plants)

TSUKERMAN, R.V., kand.tekhn.nauk; NIKONOV, A.P., kand.tekhn.nauk; BYKOV,  
V.M., kand.tekhn.nauk.

Operational reliability of high-pressure boiler and turbine equipment. Energomashinostroenie 9 no.6:27-30 Je '63. (MIRA 16:9)

AUTHORS: Bykov, V.N., Vinogradov, S.I., Levdik, V.A. and Golovkin, V.S. 70-5-11/31

TITLE: A Two-crystal Neutron Spectrometer (Dvukhkristal'nyy Neytronnyy spektrometr)

PERIODICAL: Kristallografiya, 1957, Vol.2, No.5, pp. 634-638 (USSR)

ABSTRACT: The Soviet atomic pile used for power generation will provide a flux of  $2 \cdot 10^{15}$  neutrons/sec  $\text{cm}^2$  which can be used for diffraction. A 5 m steel tube emerges through the shielding and provides a naturally collimated beam of 24' divergence. The integrated thermal neutron flux falling on the monochromator is  $10^7$  neutrons/ $\text{cm}^2$ sec. The monochromatisation is by reflection from the 200 plane of a lead crystal  $135 \times 55 \times 20$  mm. The half width of the reflected beam is usually 37' corresponding to an energy uncertainty of 9%. There may also be 2.5% diffusely scattered neutrons. After monochromatisation the flux is about  $10^4$  neutrons/ $\text{cm}^2$ sec. The lead crystal which is behind 80 cm of concrete can be moved in any required direction to direct the beam down the final collimator which is made of paraffin and boron carbide. The apparatus is more properly called a diffractometer as the reflected intensities are measured on a boron trifluoride counter and recorded as in X-ray diffractometry. The specimen counter distance is

Card1/2

A Two-crystal Neutron Spectrometer.

70-5-11/31

20 - 100 cm. Angles can be measured on a 110 cm dia. circle to 2'. A specimen to counter rotation ratio of 1:2 is provided. The counter has a diameter of 2 cm and a length of 27 cm; it is filled to 700 mmHg with  $\text{BF}_3$  enriched 4.7 X in  $\text{B}^{10}$ . A test crystal of KBr of dimensions 6 x 6 x 8 mm gave peak counts of 3 100/min (200 reflection) with a uniform background of about 100/min and very satisfactory resolution. An iron rod (8 mm dia.) which was polycrystalline, gave peaks of 200/min with a background of 20/min. Acknowledgments to A.K. Krasin, V.S. Lyashenko and L.S. Gudkov. There are 6 figures and 5 references, 2 of which are Slavic.

SUBMITTED: March 24, 1957.

AVAILABLE: Library of Congress  
Card 2/2



RYKOV, V. N.

28(6)  
 Al'medeliya mek SSSR. Institut metallurgii  
 Sovremennyye problemy metallurgii (Modern Problems in Metallurgy)  
 Moscow, Izd-vo AN SSSR, 1958. 640 p. 5,000 copies printed.  
 Reep. Ed.: A.M. Samarin, Corresponding Member, USSR Academy of  
 Sciences; Eds. of Publishing House: V.S. Kishornikov, and  
 A.M. Berezny; Tech. Ed.: V.V. Polyakova.

FOREWORD: This book is intended for scientific and technical per-  
 sonnel in the field of metallurgy.

CONTENTS: This is a collection of articles on certain aspects of  
 Soviet metallurgy. The book is dedicated to Academician  
 Ivan Pavlovich Rykov on the occasion of his 75th birthday. The  
 book is divided into seven parts. The first part consists of  
 two articles presenting a brief account of the biography and  
 professional activity of the Soviet metallurgist. It includes an  
 article by John Chipman, Michael Grant, and John Elliott (M.I.T.,  
 U.S.A.) describing their meeting with Rykov in Moscow and also his  
 visit to the United States. The second part consists of three  
 articles and deals with raw materials and fuels for the Soviet  
 metallurgical industry. The third part represents the major  
 portion of the book. It consists of 25 articles dealing with  
 the various aspects of the metallurgy of pig iron and steel.  
 The fourth part consists of two articles treating the metallur-  
 gical aspects of nonferrous metals. The fifth part consists of three  
 articles on the forming of metals. The sixth part consists of three  
 articles discussing certain aspects of physical metallur-  
 gical problems. The last part deals with general problems in the field  
 of metallurgy. References are given after each article. No  
 preambles are mentioned.

TABLE OF CONTENTS:

|   |          |
|---|----------|
| Modern Problems in Metallurgy   | 507/1728 |
| Kurdymov, G.V. (Academician, Central Scientific Research In-<br>stitute of Ferrous Metallurgy). The Nature of Martensite<br>Transformations   | 546      |
| Agayev, N.Y., V.A. Rykov, and V.A. Trepatnikov (Corresponding<br>Members, AN SSSR Metallurgical Institute Imeni A.A. Rykov,<br>Azerbaijan and Ferrous Metallurgical Institute Ouzb.) The Nature of<br>Brittleness in Chrome | 556      |
| Odin, I.A. (Corresponding Member, AN SSSR, Metallurgical<br>Institute Imeni A.A. Rykov, AS UZSSR) Structural Theory<br>of the Group of Metals   | 564      |
| Zhil'mo Isak (Doctor of Technical Sciences, Corresponding<br>Member of the Academy of Sciences of Hungary, Professor)<br>Characteristics of Structural Steel Properties as Determined<br>by the Work of Maximum Deformation | 572      |
| Card 11/12  |          |

BYKOV, V.N.

On the classroom demonstration method of teaching physics in pre-revolutionary Russian schools of general education. Part 1. Uch zap. Ped inst Gerts. 197:268-279 '58. (MIRA 16:9)  
(Physics—Study and teaching)

BYKOV, V.N., starshiy prepodavatel'

Basic characteristics of the experimental method of research and its  
significance in teaching. Uch.zap.Abak.gos.ped.inst. no.4:212-230  
'58. (MIRA 14:10)

1. Kafedra fiziki Abakanskogo gosudarstvennogo pedagogicheskogo  
instituta.

(Physics--Experiments)

70-3-3-8/36

**AUTHORS:** Bykov, V.N. and Vinogradov, S.I.

**TITLE:** On the Question of the Distribution of the Atoms of Carbon in the Lattice of Austenite (K voprosu o raspolozhenii atomov ugleroda v reshetke austenita)

**PERIODICAL:** Kristallografiya, 1958, Vol 3, Nr 3, pp 304 - 307 (USSR)

**ABSTRACT:** In the elementary cell of gamma iron there are two sorts of vacancies, 4 octahedral and 8 tetrahedral. The distribution of carbon atoms in these vacancies demands neutron diffraction techniques as the coherent scattering amplitudes for iron and carbon are  $b_{Fe} = 0.96 \times 10^{-12}$  cm and  $b_C = 0.68 \times 10^{-12}$  cm respectively. ( $b_{Mn} = -0.37 \times 10^{-12}$  cm.) An austenite with the composition 1.5% C, 35% Mn and 63.5% Fe was examined. A diffractogram was made from a polycrystalline specimen with a two-crystal neutron spectrometer from  $\theta = 6^\circ$  to  $52^\circ$ . Intensities were measured and compared with values calculated for octahedral and tetrahedral location of the carbon atoms. It clearly showed that the C atoms were in octahedral positions statistically distributed with co-ordinates  $(0,0,1/2)$ ;  $(0,1/2,0)$ ;  $(1/2,0,0)$  and  $(1/2,1/2,1/2)$ .

Card 1/2

70-3-3-8/36

On the Question of the Distribution of the Atoms of Carbon in the  
Lattice of Austenite

A carbon-free specimen with 35% Mn was examined as confirmation.  
Acknowledgments to Professors Ye.S. Makarov and B.G. Lyashchenko.  
There are 4 figures and 4 references, 3 of which are Soviet  
and 1 German.

SUBMITTED: December 8, 1957

Card 2/2

SOV/120-58-6-27/32

AUTHORS: ~~Bykov~~, V. N. and Levdik, V. A.

TITLE: A High Efficiency Boron Counter (Bornyy schetchik s vysokoy effektivnost'yu)

PERIODICAL: Pribery i tekhnika eksperimenta, 1958, Nr 6, p 113 (USSR)

ABSTRACT: This counter is used for the detection of neutrons and is shown in Fig.1. It is filled with enriched  $\text{BF}_3$  (88%  $\text{B}^{10}$ ). The body of the detector is 400 mm long and its diameter is 25 mm. It is made of stainless steel and its inner surface is polished. The front window is plane and is made of boronless glass 1 mm thick. In Fig.1, 1 is a platinum seal, 2 is the isolator (boronless glass), 3 is a ring (ferrochrome), 4 is the body, 5 is a tungsten filament. For a parallel beam of thermal neutrons the efficiency is close to 100%. The characteristic curve of the counter is shown in Fig.2, in which the count rate is plotted as a function of the applied voltage. For slow neutrons the characteristic curve has a plateau beginning at 2.7 kV. There are 2 figures and 1 Soviet reference which is translated from English.

SUBMITTED: December 9, 1957.

Card 1/1

24.7100

77122  
SOV/70-4-6-23/31

AUTHORS: Bykov, V. N., Kazarnikov, V. V.

TITLE: Concerning the Structure of an Intermetallic Zr Compound. Brief Communication

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr. 6, pp 924-925 (USSR)

ABSTRACT: Acicular crystals of  $ZrBi_2$  4-5 mm long and 0.2 mm in diameter, were grown in molten Bi. They had orthorhombic prism faces (100), (110), (120) and domatic (210), (130). Their diffraction symmetry is  $D_{2h}$ , diffraction symbol  $mmmPnn$ ; identity periods are  $a = 10.2 \text{ \AA}$ ,  $b = 15.5 \text{ \AA}$ ,  $c = 4.0 \text{ \AA}$ ; volume of the unit cell  $V = 632 \text{ \AA}^3$ , measured density =  $10.6 \pm 0.1$ , computed density =  $10.73$ ; there are 8 molecular weights per unit cell. Rotating-crystal photographs about c, and oscillating-crystal photographs about a, b, and c were taken by Cu radiation, interpreted and indexed graphically.  $ZrBi_2$  does not seem to be isomorph with the known metallic compounds of  $MeBi_2$ -type. There are 4 references, 1 Soviet, 1 German, 1 Danish, 1 U.K. The U.K. reference is P. J. Barton, G. W. Greenwood,

Card 1/2

Concerning the Structure of an  
Intermetallic Zr Compound. Brief  
Communication

77122  
SOV/70-4-6-23/31

J. Inst. Metals, 86, 504, 1957-1958.

SUBMITTED: July 21, 1959

Card 2/2



18.1200, 18.7500

66224

SOV/126-8-3-7/33

AUTHORS: Lyashenko, V.S., Bykov, V.N. and Pavlinov, L.V.  
TITLE: Study of Self-Diffusion of Zirconium and Zirconium-Tin Alloys  
PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 3, pp 362-369 (USSR)

ABSTRACT: In this paper the influence of tin additions on the activation energy of self-diffusion of zirconium has been investigated. Tin was chosen as the alloying element for its reputedly beneficial influence on the corrosion resistance of zirconium. Zirconium iodide (99.6%) with the following impurities was used for the investigation: Hf - 0.07%, N - 0.014%, Fe - 0.04%, Si - 0.05%. This was remelted in an electric arc furnace of the MIFI-9-3 type in an argon atmosphere. Binary zirconium alloys, containing 1.30, 2.39 and 3.54 wt per cent tin, were melted under the same conditions. All specimens were given a homogenizing anneal at 1000°C for 5 hours. The dimensions of the specimens were 10 x 10 x 20 mm. The radioactive isotope Zr-95, which was applied to the specimens by spraying in vacuum, was used for the determination of the coefficient of self-diffusion of

Card 1/6

4

66224

SOV/126-8-3-7/33

## Study of Self-Diffusion of Zirconium and Zirconium-Tin Alloys

zirconium. The specimens were placed on the water-cooled lid of a chamber, in which a residual pressure of  $10^{-3}$  mm Hg was maintained, and sprayed. The film of the zirconium isotope applied was impervious and 0.5 to 1  $\mu$  thick. The diffusion anneal at temperatures of 650 to 827°C was carried out in evacuated quartz ampoules. At temperatures of 918 to 1260°C, the specimens were annealed in a quartz ampoule under continuous evacuation (at a residual pressure of approximately  $5 \times 10^{-4}$  mm Hg). At temperatures of 1325 to 1500°C, the diffusion anneal was carried out in a vacuum furnace with a tungsten heater (at a residual pressure of approximately  $5 \times 10^{-4}$  Hg). Pairs of specimens, their active faces put together, were annealed at the same time. In order to prevent any possible oxidation, the specimens were always covered with zirconium filings. Annealing was carried out continuously and the heating and cooling time of the specimens was allowed for by an appropriate correction. The annealing time in the  $\beta$ -range was 1 to 30 hours (the depth of penetration being 200 to 300  $\mu$ ). In the  $\alpha$ -range, the accuracy of diffusion coefficient measurements is at the

4

Card 2/6

66224

SOV/126-8-3-7/33

## Study of Self-Diffusion of Zirconium and Zirconium-Tin Alloys

limit of sensitivity of the method, as the depth of penetration on annealing for 222 to 1076 hours was found to be 30 to 60  $\mu$ . The temperature was measured by a Pt/Pt-Rh thermocouple. The layers were removed with a grinding wheel. The thickness of a layer was measured by the difference in specimen thickness before and after removal of the layer, using the vertical optical length measuring instrument of the IZV-1 type. The accuracy of such an instrument is  $\pm 1 \mu$ . However, as the layers removed may not be absolutely parallel to each other, the actual error in measuring the layer thickness is estimated at 2 to 3  $\mu$ . In the  $\alpha$ -region, the thickness of a layer was measured by the IZV-1 instrument and also calculated from the change in weight of the specimens, which were weighed with an accuracy of  $\pm 0.0001$  g. In this case, the error in measuring the layer thickness did not exceed 1  $\mu$ . The integral activity of the specimens was measured with a B-2 ridometer, using a face counter of the MST-17 type. The duration of each measurement was 10 min. The  $\gamma$ -radiation of Nb, being the product of the decay of Zr-95, was evaluated using a filter. The

Card 3/6

66224

SOV/126-8-3-7/33

## Study of Self-Diffusion of Zirconium and Zirconium-Tin Alloys

absorption coefficient of  $\beta$ -irradiation of zirconium, which was measured by using aluminium filters, was found to be  $350 \text{ cm}^{-1}$ . The coefficient of self-diffusion was measured by removing layers and determining their specific activity from the difference of the integral activities of the specimen before and after removing the layer (Ref 6). The results of measurements of self-diffusion coefficients of zirconium are shown in Table 1 and in Fig 1 and 2 ( $650$  to  $827^\circ\text{C}$  for the  $\alpha$ -phase;  $918$  to  $1500^\circ\text{C}$  for the  $\beta$ -phase). The temperature dependence of the self-diffusion coefficient, calculated graphically and by the least squares method, can be represented by the equations

$$D = 5.9 \times 10^{-2} \times \exp\left(-\frac{52000}{RT}\right) \text{ cm}^2/\text{sec} \quad (\alpha\text{-phase})$$

$$D = 2.4 \times 10^{-3} \times \exp\left(-\frac{38000}{RT}\right) \text{ cm}^2/\text{sec} \quad (\beta\text{-phase})$$

Card 4/6

In Fig 3, the dependence of the concentration logarithm on  $x^2$  ( $x$  = depth of penetration) for specimens annealed

66224

SOV/126-8-3-7/33

## Study of Self-Diffusion of Zirconium and Zirconium-Tin Alloys

at 918, 996 and 1260°C is shown. In Fig 4, the dependence of the concentration logarithm on the depth of penetration is shown for the same specimens. Fig 5 shows the microstructure of zirconium after annealing at 1500°C for 1 hour, followed by cooling at the rate of 100°C/min. The graph of the dependence of the diffusion coefficient of zirconium on temperature in the investigated alloys is shown in Fig 6. The parameters of diffusion of zirconium are shown in Table 2. The values of  $Q$  (activation energy) and  $\lg D_0$  in relation to tin content are shown in Fig 7 and 8. In Fig 9, the dependence of  $\lg D_0$  on activation energy is shown. The authors arrived at the following conclusions: 1. In the temperature range 900 to 1100°C, grain-boundary diffusion occurs preferentially. The ratio of grain-boundary to volume-diffusion coefficients at 918°C is  $2 \times 10^5$ . 2. Results have been obtained on the influence of tin on the parameters of self-diffusion of  $\alpha$ -zirconium. An addition of up to 3.5 wt % tin raises the activation energy in the temperature range 740 to 827°C and the greatest value for the activation energy (75000 cal/g-at) is obtained for an alloy containing 2.39% Sn.

4

Card 5/6

66224

SOV/126-8-3-7/33

Study of Self-Diffusion of Zirconium and Zirconium-Tin Alloys

3. A comparison of the values of  $\lg D_0$  and the corresponding values of activation energy shows that  $\lg D_0$  depends linearly on  $Q$ . The equation representing this relationship takes the form  $\lg D_0 = 1.94 \times 10^{-4} \times Q - 11.4$ . There are 9 figures, 2 tables and 11 references, 8 of which are Soviet and 3 English.

SUBMITTED: September 13, 1958



Card 6/6

24.7900

66411

SOV/20-128-6-15/63

AUTHORS: Bykov, V. N., Golovkin, V. S., Ageyev, N. V., Corresponding  
Member, AS USSR, Levdik, V. A., Vinogradov, S. I.

TITLE: On the Magnetic Structure of Chromium

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 6, pp 1153-1156  
(USSR)

ABSTRACT: Brief mention is first made of previous investigations made in this field. To obtain clearer concepts concerning diffraction, monocrystalline chromium samples were used in a purity degree of 99.9667%. Octahedric monocrystals (sizes of from 3 to 5 mm) were adjusted on a two-armed goniometer of type GD-1, and lack of blocks was controlled by X-ray structural analysis. The recording took place in the planes (100), (110), (111), (210), through an angle extending to 40°. Diffraction on chromium monocrystals offers a clear picture of the splitting of the magnetic reflection in the (100) plane. Position and analysis of intensity in the medium triplet peak showed that this peak is the second order of the nuclear reflection on (200). The two outer peaks are evidently the split magnetic reflection on (100). A picture taken at temperature -100°C reveals an important in-

Card 1/3

66411

On the Magnetic Structure of Chromium

SOV/20-128-6-15/63

crease in intensity of the split reflection peaks on (100), while intensity of nuclear peaks and, correspondingly, those of their second orders with an odd sum of the indices are increased only by the Debye temperature factor (within the measuring accuracy). With temperature dropping with rising intensity, also the angular distance between the split peaks widens from 25' at 20°C to 30' at -100°C. In the upper and lower critical temperature, a steep rise and an abrupt drop of intensity take place respectively. As the curves of intensity variations take a different course, the existence of a temperature hysteresis of intensity is very probable. The temperature range in which a magnetic reflection exists may be considered the range of the existence of an antiferromagnetic state of chromium. The temperature of antiferromagnetic transformation (44 and -115°C) found by the present investigation agree with the points of anomalous changes of chromium properties within the error limits due to the metal purity. Experimental results concerning the scattering of neutrons and dilatometric measurements are well reproducible in different samples of monocrystalline chromium. On the whole, the results obtained agree with concepts of the magnetic sublattice, and even supply substantial integrations leading

Card 2/3



On the Magnetic Structure of Chromium

66411

SOV/20-128-6-15/63

beyond the prevailing interpretation. The magnetic lattice of chromium is no repetition of the crystal lattice, but is deformed to a tetragonal symmetry. Certain directions are correlated with a minimum of energy which becomes crystallographically noticeable as a deviation of the magnetic lattice parameters from the nuclear lattice, i.e. by a certain degree of tetragonality of the magnetic lattice. The even peaks of split reflection on (100) agree with nuclear reflection as to the width, and they have at all temperatures the same distance from the theoretical position. The author thanks V. A. Trapeznikov for having supplied the chromium monocrystals. There are 4 figures and 13 references, 4 of which are Soviet.

4

SUBMITTED: July 6, 1959

Card 3/3

BYKOV, V. N., GOLOVKIN, V. S., LEVDIK, V. A., VINOGRADOV, S. I.

"The Problem of the Magnetic Structure of Chromium."

paper presented at the Symposium of the International Atomic Energy Agency on Pile Neutron Research in Physics, Vienna. 17-21 Oct 1960.

Atomic Power Station, Obninsk, Stat Committee on Atomic Energy. (BYKOV)

18.1200,21,3400

71249  
507/44-2-11/50

AUTHORS: Lyashenko, V S., Bykov, V. N.

TITLE: A Study of Uranium-Germanium Alloys. (Work was completed in 1955.) Letter to the Editor

PERIODICAL: Atomnaya energiya, 1960, Vol 5, No 2, pp 146-148 (USSR)

ABSTRACT: Preparation and the Thermal Processing of Alloys. There is no mention in literature of any U-Ge alloy, although researchers reported the existence of intermetallide  $UGe_3$ . The authors started from a 99.86% pure U and 99.99% pure Ge. Alloys were produced in an induction oven in beryllium oxide crucibles in  $10^{-5}$  to  $10^{-4}$  mm Hg vacuum. The authors prepared 30 alloys of different combination, and the high-temperature parts of the diagram were investigated on alloys obtained by hot compression. All alloys were homogenized by annealing in a vacuum oven for 150 hr at  $900^{\circ}$  C. Alloys of 40

Card 1/8

A Study of Uranium-Germanium Alloys.  
(Work was completed in 1955.),  
Letter to the Editor

77249

SOV/59-8-2-14/10

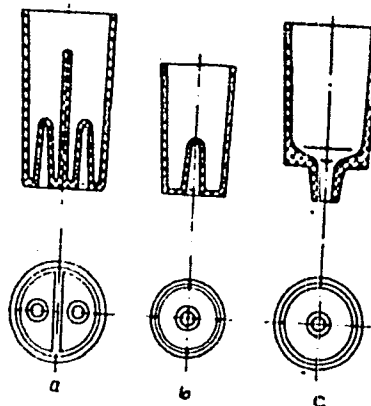
to 75% atom of Ge were in addition annealed at  $1,350^{\circ}\text{C}$  for 25 hr and afterwards for 100 hr at  $1,000^{\circ}\text{C}$ . To investigate high-temperature regions of the diagram and the limits of dissolution of components, hardening was done in the vacuum oven from 720, 950, 1,200, and  $1,300^{\circ}\text{C}$  in a cooling oil bath. Experimental Methods and Results. Thermal analysis was performed in a vacuum oven with tungsten heater. Thermocouples were practically inside the ingot as a result of the use of crucibles with specially shaped bottoms (see Fig. 1). This enabled the obtaining of high sensitivity. The platinum-platinorhodium joint was protected by a molybdenum cap. A vanadium ingot served as a standard. The simple and differential cooling curves were registered on a registering pyrometer of N. S. Kurnakov. The simple curve was also registered on the self-registering calibrated compensating potentiometer EPP-CG. During thermal analysis heating was performed, while pumping pressure was kept down to  $10^{-4}$  mm Hg. The alloy was kept

Card 2/8

A study of Uranium-Germanium Alloys.  
(Work was completed in 1955.)  
Letter to the Editor

77249  
SOV/89-8-2-14/30

Fig. 1. Beryllium oxide  
crucibles: (a,b) for thermal ana-  
lysis; (c) for casting of alloys.



Card 3/8

A Study of Uranium-Germanium Alloys.  
(Work was completed in 1955.)  
Letter to the Editor

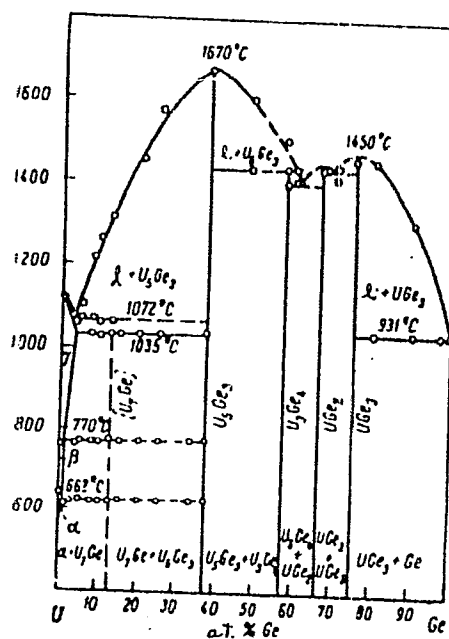
77249  
SOV/89-8-2-14/30

at the maximum temperature for 10 min and then the oven was filled with argon from 350 to 500 mm Hg. Curves were taken only during the cooling period performed at a rate of  $15^{\circ}\text{C/min}$ . Cooling curves of alloys melting above  $1,450^{\circ}\text{C}$  were taken by means of a tungsten-molybdenum thermocouple, using a sensitive "Spidomax" compensation setup. Fig. 3 contains average values of melting and phase transition temperatures. Dilatometer analysis was done using a device described by Strelkov and others (Izv. AN SSSR, Ser. fiz., 17, 3 (1953) with a sensitivity of  $2 \cdot 10^{-6}$  cm. Data were taken every 2 to  $3^{\circ}\text{C}$  while heating at a  $4-5^{\circ}\text{C/min}$  rate. The values of the coefficient of thermal expansion are given in Table A.

Card 4/8

A Study of Uranium-Germanium Alloys. 77249 SOV/89-8-2-14/30  
(Work was completed in 1955.)  
Letter to the Editor

Fig. 3. Equilibrium diagram of uranium-germanium alloys.



Card 5/8

A Study of Uranium-Germanium Alloys.  
(Work was completed in 1955.)  
Letter to the Editor

77249  
SOV/89-8-2-14/30

Table A. Values of the coefficient of thermal expansion ( $\alpha \cdot 10^6$ ) of some uranium-germanium alloys.

| Composition<br>of alloy<br>% atom of<br>germanium | Temperature interval, °C |         |         |         |         |
|---|--------------------------|---------|---------|---------|---------|
|   | 300-400                  | 400-500 | 500-600 | 600-700 | 700-800 |
| Uranium   | —                        | 22,6    | 34,0    | 76,5    | 26,2    |
| 1,0   | 27,0                     | 29,0    | 33,0    | 79,0    | 33,0    |
| 5,0   | 21,0                     | 22,5    | 29,0    | 60,5    | 27,5    |
| 12,5  | 24,0                     | 23,0    | 22,0    | 34,0    | 21,0    |
| 37,5  | 21,8                     | 19,5    | 19,5    | 21,5    | 21,0    |
| 57,14   | 10,2                     | 10,5    | 10,0    | 10,0    | 10,0    |
| 66,6  | 12,0                     | 12,0    | 12,0    | 11,0    | 11,0    |
| 75,0  | 21,0                     | 19,0    | 23,0    | 23,0    | 26,0    |
| Germanium   | 7,5                      | 7,7     | 7,3     | 7,3     | 7,3     |

Card 6/8



A Study of Uranium-Germanium Alloys.  
(Work was completed in 1955.)  
Letter to the Editor

77249  
SOV/89-8-2-14/30

Electrical and chemical etching was used to expose the microstructure. The authors discovered monophase structures with 37.5, 57.14, 66.6, and 75% atom. of germanium, corresponding to  $U_5Ge_3$ ,  $U_3Ge_4$ ,  $UGe_2$ , and  $UGe_3$ . Alloys with 12.5% of germanium, hardened from  $1,000^{\circ}C$  after previous prolonged heating, showed high melting point compound  $U_5Ge_3$  in eutectic with 3.5% atom. germanium with subsequent formation of  $U_7Ge$ . The article contains four photographs of this 12.5% atom. combination corresponding to various soaking times. X-ray analysis confirmed the presence of the various metallides. The author also concluded that the limit of solubility of Ge in  $\alpha$ - and  $\beta$ -uranium is approximately 1%, in  $\gamma$ -uranium up to 3%, of Ge. Uranium, for all practical purposes, does not dissolve in Ge. In the present diagram there is a considerable similarity with the diagrams for U alloys with other members of the fourth periodic group, Si and Pb. There

Card 7/8

A Study of Uranium-Germanium Alloys.  
(Work was completed in 1955.)  
Letter to the Editor

77249  
SOV/89-8-2-14/30

are 3 figures; and 5 references, 2 Soviet, 1 Italian,  
1 U.K., 1 U.S. The U.K. and U.S. references are:  
B. Frost, J. Maskrey, J. Inst. Metals, 82, 4 (1953);  
F. Rough, A. Bayer, Constitution of Uranium and  
Thorium Alloys, Report BMI-1300 (1958).

SUBMITTED: October 7, 1959

Card 8/8

18.7500 1555

85966  
S/126/60/010/005/014/030  
E193/E483

AUTHORS: Lyashenko, V.S., Bykov, V.N. and Pavlinov, L.V.

TITLE: The Effect of Iron and Nickel Additions on Self-Diffusion in  $\alpha$ -Zirconium

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.5, pp.727-731

TEXT: Using the radioactive tracer ( $Zr^{95}$ ) technique, the present authors studied the effect of small (up to 0.4%) additions of iron and nickel on self-diffusion in zirconium at 650 to 830°C. The temperature dependence of the coefficient of self-diffusion  $D$  of Zr-base alloys, containing 0.14, 0.42, 0.25% Fe (Curves 1, 2 and 3) and 0.3 or 0.2% Ni (Curves 4 and 5), is shown in Fig.1, where the same relationship for pure zirconium is illustrated by the broken curve. It will be seen that addition of nickel and iron decreases the coefficient of self-diffusion in  $\alpha$ -zirconium by a factor of 2-3. This effect is attributed not only to the change in the nature of the solid solution, which affects the volume diffusion, but also to the change of the microstructure of zirconium which, in the presence of iron or nickel, loses its needle-like character. As a result of this, the total surface of

Card 1/2

85966

S/126/60/010/005/014/030  
E193/E483

The Effect of Iron and Nickel Additions on Self-Diffusion in  
 $\alpha$ -Zirconium

the grain interfaces decreases and so does the surface-diffusion  
component of the self-diffusion process. There are 4 figures,  
3 tables and 9 references: 8 Soviet and 1 Non-Soviet.

SUBMITTED: November 21, 1959 (initially)  
May 12, 1960 (after revision)

Card 2/2

85969

18.7500 1555

S/126/60/010/005/019/030  
E032/E414

AUTHORS: Lyashenko, V.S., Bykov, V.N. and Pavlinov, L.V.

TITLE: Self-Diffusion of Zirconium in Some Zirconium Based  
Binary and Tertiary Alloys

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.5,  
pp.756-762

TEXT: The self-diffusion of Zr in binary alloys of Zr and Nb, containing up to 31.1 wt.% niobium, and tertiary alloys of Zr and Nb (25%) with Mo (3%), tin (2.8%) and Cr (0.6%) was investigated. The diffusion coefficients were determined with the aid of the radioactive isotope  $Zr^{95}$  in the temperature range 900 to 1200°C. The radioactive Zr isotope was deposited onto the specimens by evaporation in vacuum. The diffusion annealing was carried out in double-walled sealed-off quartz ampoules. The ampoules were evacuated down to a pressure of about  $10^{-3}$  to  $10^{-4}$  mm Hg and carefully outgassed before being sealed off. In order to prevent possible oxidation, the specimens were covered with a layer of zirconium shavings. Layers 2 to 3  $\mu$  thick were removed at a time. The experimental errors (calculated by the least squares

Card 1/4

85969

S/126/60/010/005/019/030  
E032/E414

Self-Diffusion of Zirconium in Some Zirconium Based Binary and Tertiary Alloys

method) were 8 to 10% and 2% for the diffusion coefficient and activation energy respectively. In all cases, the logarithm of the diffusion coefficient was found to depend linearly on the reciprocal of the absolute temperature. The results obtained are summarized in the following tables:

Table 2

| No. of alloy | $D_0$ , cm <sup>2</sup> /sec | $\Delta H$ , cal/g . at |
|--------------|------------------------------|-------------------------|
| 1            | $5.2 \times 10^{-5}$         | 25400                   |
| 2            | $9.2 \times 10^{-5}$         | 28700                   |
| 3            | $8.9 \times 10^{-5}$         | 28600                   |
| 4            | $9.1 \times 10^{-5}$         | 29200                   |
| 5            | $8.7 \times 10^{-5}$         | 29600                   |
| 6            | $1.1 \times 10^{-4}$         | 32600                   |
| 7            | $1.1 \times 10^{-4}$         | 33800                   |
| 8            | $6.6 \times 10^{-4}$         | 37900                   |
| 9            | $1.3 \times 10^{-3}$         | 42600                   |

Card 2/4

85969  
S/126/60/010/005/019/030  
E032/E414

Self-Diffusion of Zirconium in Some Zirconium Based Binary and Tertiary Alloys

| Table 3      |                                  |                         |
|--------------|----------------------------------|-------------------------|
| No. of alloy | $D_0$ , $\text{cm}^2/\text{sec}$ | $\Delta H$ , cal/g · at |
| 1            | $1.0 \times 10^{-2}$             | 48200                   |
| 2            | $2.1 \times 10^{-2}$             | 49500                   |
| 3            | $3.2 \times 10^{-3}$             | 43700                   |

Table 2 refers to the binary alloys and the heading "No. of alloy" refers to the following concentrations of Nb, respectively, 0.5, 1.2, 2.2, 5.2, 9.5, 15.4, 18.0, 26.9, 31.3 (% by weight).

In Table 3 the three alloys were: Zr + 25.6% Nb + 2.8% Sn (No.1); Zr + 23% Nb + 0.6% Cr (No.2); Zr + 28% Nb + 3% Mo (No.3).

The addition of Nb to Zr is found to reduce the diffusion coefficient and increase the activation energy in the above  
Card 3/4

85969

S/126/60/010/005/019/030  
E032/E414

Self-Diffusion of Zirconium in Some Zirconium Based Binary and  
Tertiary Alloys

temperature interval. In the case of the tertiary alloys, the addition of molybdenum, tin or chromium to the alloy Zr + 25% Nb leads to a further increase in the activation energy and a reduction in the diffusion coefficient. There are 7 figures, 3 tables and 4 references: 3 Soviet and 1 Non-Soviet.

SUBMITTED: November 25, 1959 (initially)  
May 12, 1960 (after revision)

Card 4/4



89672

18.7500

S/129/61/000/002/004/014  
E073/E335

AUTHORS: Lyashenko, V.S., Doctor of Chemical Sciences,  
Professor, Bykov, V.N., Candidate of Technical  
Sciences and Rudenko, V.A., Engineer

TITLE: Sigma Phase in the Steel 1Kh20N14S2 (1Kh20N14S2)

PERIODICAL: Metallovedeniye i termicheskaya obrabotka  
metallov, 1961, No. 2, pp. 22 - 24

TEXT: The Steel 1Kh20N14S2 (E1211) (E1211) has favourable mechanical properties in the initial state (Ref. 1) but is prone to brittleness at 500 to 700 °C, which is attributed to the rejection of carbides along the grain boundaries. However, the  $\sigma$ -phase has not been observed during this process. The authors have studied the problem of stabilising the structure of this steel (0.14% C, 20.2% Cr, 15.5% Ni, 2.44% Si and 1.14% Mn). It was aged at 650 °C for 5 000 hours. The microstructure investigations were made by means of optical and electron microscopes; the phase-components were studied by means of X-ray. The specimens were preliminarily stabilised at 1 000 °C for 1 hour, held at 650 °C for

Card 1/7

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S/129/61/000/002/004/014  
E073/E335

Sigma Phase in the Steel 1Kh20N14S2

4

durations of 50, 100, 500, 1 000, 2 000 and 5 000 hours, respectively. The polished specimens were etched by means of a 20%  $H_2O_2$  solution in concentrated hydrochloric acid. Two etching regimes were applied: a weak one for detecting the fine structure of the  $\sigma$ -phase and a normal one for studying the distribution of the carbide phase and of the grain boundaries. Electron-microscope studies of the structure were carried out on chromium-shaded colloidal replicas. The phase composition of the steel before and after ageing was determined by X-ray analysis of the polished specimen and of electrolytically-produced precipitates. In the original state the structure of the steel EI211 consists of coarse austenite grains and globular carbide formations of the composition  $Me_{23}C_6$ . During the first 50-100 hours of ageing, a large number of secondary carbide particles precipitate, the grain boundaries increase in size and after 500 hours ageing a continuous carbide network can be detected. Only

Card 2/7

89672

S/129/61/000/002/004/014  
E073/E335

Sigma Phase in the Steel 1Kh20N14S2  
the lines of the carbide  $\text{Me}_{23}\text{C}_6$  can be detected on the X-ray diffraction patterns of electrolytically separated residues from specimens aged for 50 to 500 hours. In specimens aged for 1 000 hours a few dark disperse rejections can be observed after weak etching. These are distributed along grain boundaries in spots where carbides accumulate and are almost always in contact with the carbides. In the X-ray diffraction pattern of the precipitates of this specimen diffraction can be observed which corresponds to the presence of the  $\sigma$ -phase. After ageing for 2 000 hours the structure of the specimen shows sections containing carbides which are surrounded by a zone with a "spongy" structure differing from the basic one. Dark rejections can be observed in the background of this zone. Apparently, if the component ratio is favourable, these areas reflect a metastable structural state corresponding to the formation of the  $\sigma$ -phase. Ageing the specimens for 2 000 to 5 000 hours led to an increase in the number and the dimensions of  $\sigma$ -phase rejections and also to

Card 3/7

89672

S/129/61/000/002/004/014  
E073/E335

# Sigma Phase in the Steel 1Kh20N14S2

the appearance of a considerable quantity of acicular separations in the grain itself. The X-ray diffraction patterns reveal only the lines of the  $\sigma$ -phase and of the carbide  $Fe_{23}C_6$ . Thus it was found that in the first period of isothermal annealing of steel at 650 °C the saturated austenite decomposes, which is accompanied by the separation of finely disperse carbides of the composition  $Me_{23}C_6$ . No separation of the  $\sigma$ -phase during this period (up to 600 hours) was observed. This is attributed to the fact that in the initial state, after stabilisation at 1 000 °C, owing to the high carbon content, this steel does not contain  $\delta$ -ferrite, the composition of which may lead to the formation of the  $\sigma$ -phase. Due to the process of carbide formation there will be a drop in the carbon and chromium concentration in the solid solution which produces favourable conditions for separation of the  $\sigma$ -phase. This is confirmed by the increase in the magnetic susceptibility. The formation of the  $\sigma$ -phase is facilitated

Card 4/7

89672

S/129/61/000/002/004/014  
EO73/E335

Sigma Phase in the Steel 1Kh20N14S2

owing to the presence in the  $\alpha$ -phase (alloyed ferrite) of components which increase the tendency to  $\sigma$ -phase formation. In addition to the formation of the  $\sigma$ -phase from unstable ferrite, a partial dissolution of the carbide occurs since with decreasing chromium concentration the solubility of carbon in the solid solution increases. On increasing the duration of the isothermal holding, local chromium-enriched sections occur owing to the solution of carbide rejections. The excess chromium produced favourable conditions for forming  $\sigma$ -phase nuclei. All the  $\sigma$ -phase rejections which were detected on the electron microphotographs and particularly in specimens which were aged for 5 000 hours did have a globular structure. The intermediate metastable phases  $\alpha'$  and  $\sigma'$  were not observed at any of the ageing stages. Apparently, introduction of these into the chain of transformations is not adequately justified. The following conclusions are arrived at:

- 1) Dispersion hardening of the steel 1Kh20N14S2 at 650 °C
- Card 5/7

89672

S/129/61/000/002/004/014  
E073/E335

Sigma Phase in the Steel 1Kh20N14S2

proceeds in two stages. The first stage of up to 500 hours duration is characterised by the rejection of secondary carbides  $Me_{23}C_6$  and their coagulations preferentially along the austenite grain boundaries. The second stage is linked with  $\delta$ -phase formation. X

- 2) For holding times exceeding 500 hours the process of coagulation of the carbide  $Me_{23}C_6$  produces favourable conditions for the formation of the  $\alpha$ -phase around the carbide particles.
- 3) The diffusion mobility of the atoms of the components of the metastable ferrite ensures growth of the  $\delta$ -phase nuclei.  $\delta$ -phase particles also grow owing to the dissolution of carbides.
- 4) In sections with a distorted crystal lattice the  $\delta$ -phase is also formed along the slip planes, the twin boundaries.  $\gamma$ -phase rejections are acicular in shape, whilst usually  $\delta$ -phase rejections have a globular structure.

Card 6/7

89672

S/129/61/000/002/004/014  
E073/E335

Sigma Phase in the Steel 1Kh20N14S2

(Note: this is almost a complete translation.)  
There are 1 figure and 5 references: 4 Soviet and  
1 non-Soviet.

Card 7/7

TSUKERMAN, R.V., ~~kand.tekhn.nauk~~; NIKONOV, A.P., kand.tekhn.nauk;  
BYKOV, V.N., kand.tekhn.nauk

Use of the boiler-turbine equipment at electric power plants with  
high parameters. Elek. sta. 32 no. 5:7-12 My '61. (MIRA 14:5)  
(Steam power plants)



L 33542-63

ACCESSION NR: AP5009157

8/0114/64/000/011/0020/0022

AUTHOR: Gokhshteyn, D. P. (Doctor of technical sciences); Dekhtyarev, V. L. (Candidate of technical sciences); Tishchenko, B. S. (Engineer); Olesovich, Ye. K. (Engineer); Khalaydzh, V. N. (Engineer); Ryabova, A. S. (Engineer); Bykov, V. N. (Engineer); Kozorez, A. I. (Engineer)

TITLE: Medium power carbon dioxide power installation

SOURCE: Energomashinostroyeniye, no.11, 1964, 20-22

TOPIC TAGS: electric power plant, carbon dioxide, electric power source

ABSTRACT: Theoretical principles for carbon dioxide power installations worked out at the Odessa Technological Institute imeni M. V. Lomonosov have shown the possibility for building high power compact units which are more economical than steam and gas turbines. Results of research on an installation of this type with a power of 50 Mw, the UKEU-50, show that the efficiency advantage of the carbon dioxide installation over steam units increases with a transition from high to medium power.

Card 1/3

L 33542-65

ACCESSION NR: AP5009157

Following is the efficiency of the installation and its elements:

|  |       |
|--|-------|
| Generator power of the installation $N$ , Mw       | 50.0  |
| Consumption of carbon dioxide $G$ , kg/sec         | 269.0 |
| Efficiency, %:                                     |       |
| of the compressor, $\eta_c$                        | 0.88  |
| of the pump, $\eta_p$                              | 0.80  |
| of the turbines, $\eta_t$                          | 0.90  |
| of the boiler, $\eta_b$                            | 0.92  |
| of the generator, $\eta_g$ :                       | 0.985 |
| mechanical, $\eta_m$                               | 0.99  |
| of the thermal flow, $\eta_{tr}$                   | 0.99  |
| of internal requirements, $\eta_{ir}$              | 0.97  |
| electrical efficiency of the engine room, $\eta_e$ | 44.1  |
| net, $\eta_{net}$                                  | 39.0  |

Card 2/3

L 33542-65

ACCESSION NR: AP5009157

In spite of the low starting temperature of 565°, the 39% efficiency of the carbon dioxide installation exceeds that of gas turbine units with a starting temperature of 675° and higher. Orig. art. has: 1 table, 3 figures.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: EE

NO REF SOV: 008

OTHER: 000

JPRS

Cord 3/3

BYKOV, V.N.; SOLOV'YEV, V.A.

On the significance of the volume factor during the formation  
of the sigma phase. Zhur. strukt.khim. 5 no. 2:315-317  
Mr-Apr '64. (MKA 17:6)

L 8888-65 EWT(m)/EWA(h) ASD(a)-1/ASD(m)-3/SSD/AFWL/RAEM(t)/ESD(ga)/  
AS(mp)-2

ACCESSION NR: AP4046042

S/0070/64/009/005/0629/0633

AUTHORS: Levdik, V. A.; By\*kov, V. N.; Golovkin, V. S.

TITLE: On the diffraction of neutrons by magnetic superstructures <sup>B</sup>

SOURCE: Kristallografiya, v. 9, no. 5, 1964, 629-633

TOPIC TAGS: chromium, magnetic structure, neutron scattering, neutron diffraction, crystal lattice structure, x ray diffraction, magnetic domain

ABSTRACT: Following an earlier investigation of the elastic scattering of slow neutrons by the magnetic structure of chromium (with N. V. Ageyev and S. I. Vinogradov, Dokl. AN SSSR, v. 128, 1153, 1959), the authors consider the elastic scattering of slow neutrons by magnetic superstructures based on a nuclear lattice with non-primitive cell. The general theory developed by Guinier (Theorie et technique de la radiocristallographie [Theory and Techniques of

Cont 1/3

L 8888-65

ACCESSION NR: AP4046042

Radio Crystallography], Dunod, Paris, 1956) for the diffraction of x-rays by bodies with arbitrary structure is used, in the simplification which makes it possible to take pure magnetic scattering into account only, and the calculations of O. Halpern and M. N. Johnson (Phys. Rev. v. 55, 898, 1939) are employed. An expression for the scattering ability is obtained in the form of a convolution of three functions, making it possible to analyze the dimensions of the magnetic domains and of structural imperfections. A hypothesis is advanced that the latter are appreciable because of the dynamic singularities of the magnetic lattice. These singularities are related with a concept "temperature coefficient of variation of the superparameter of the magnetic structure," which the authors introduce. The example of diffraction of neutrons by a sinusoidal model of chromium without account of temperature effect is considered. This model is that of a sinusoidally-modulated antiferromagnetic structure, based on a body-centered lattice. It is shown that the diffraction patterns of the sinusoidal helical and antiphase models

Cont 2/3

L 8888-65

ACCESSION NR: AP4046042

are different. Some factors which must be taken into account when determining the magnetic moments of chromium atoms from the experimental data are discussed. "The authors thank V. M. Agranovich and Yu. V. Konobeyev for valuable remarks." Orig. art. has: 16 formulas.

ASSOCIATION: None

SUBMITTED: 06Mar64

ENCL: 00

SUB CODE: SS, NP

NP REF SOV: 003

OTHER: 007

Card 3/3

L 24852-65 EWT(m)/EPF(n)-2/T/EPF(t)/EVP(b) Pu-L IJP(c)/ASD(u)-5/ASD(f)-3/  
 ASI(m)-3/AS(mp)-2/AFMDC JW/JD/JG  
 ACCESSION NR: AP4046097 S/0126/64/018/003/0459/0461

AUTHOR: Pavlinov, L. V.; By\*kov, V. N.

TITLE: Self diffusion in molybdenum

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 3, 1964, 459-461

TOPIC TAGS: selfdiffusion, molybdenum, niobium, tungsten, zirconium, titanium, uranium, polymorphic transformation, body centered lattice, face centered lattice, activation energy, fusion point

ABSTRACT: Selfdiffusion was investigated within the 2155-2540C range and its coefficient computed by method of the integral residue with radioactive isotope Mo-99. Mo specimens contained  $3 \cdot 10^{-2}\%$  C, less than  $10^{-3}\%$  Fe, less than  $10^{-3}\%$  Ca, less than  $3 \cdot 10^{-4}\%$  Cr, Ni, Ag, Cu, Al, Mg, Mn. Homogenizing was done at 2155C, 2220C, 2330C, 2430C and 2540C. Selfdiffusion in Mo with a body-centered cubic lattice was found to obey the same laws as selfdiffusion in metals with a face-centered cubic lattice. This also applied to the relationship between the

Card 1/2



L 24852-65

ACCESSION NR: AP4046097

activation energy and the fusion point  $\Delta H = (35-40)T_g$  -- with  $T_g$  being the absolute fusion point-- and to the relationship between the activation energy and the heat of sublimation  $L_g: \Delta H \approx 0.65 L_g$ . Mo, Nb and W have one crystal lattice in the solid phase independent of temperature conditions while Zr, Ti and U occur in several crystal modifications. Therefore, the inevitable polymorphic transformations which lead to flaws in the crystal structure should always be taken into account. The authors conclude that selfdiffusion in body-centered metals that do not undergo polymorphic transformation is governed by the same laws as selfdiffusion in metals with a face-centered lattice. However, appreciable deviations from this pattern were observed in body-centered metals in which polymorphic transformations occur. The orig. art. has: 2 tables.

ASSOCIATION: None

SUBMITTED: 07Jan64

ENCL: 00

SUB CODE: MM

NO REF SOV: 006

OTHER: 009

Cor 2/2

DOZORTSEV, E.N.; BYKOV, V.N.

Isolation of the Malinovskiy superhorizon in the Kamenny Log Swell  
in the Kama portion of Perm Province. Neftegaz.geol. i geofiz.  
no.7:11-14 '65. (MIRA 18:8)

1, Permskiy politekhnicheskii institut i Tsentral'naya nauchno-  
issledovatel'skaya laboratoriya ob'yedineniya "Perm'neft'".

BYKOV, V.N.; DOZORTSEV, R.N.

. First gas-bearing area in the Veslyana swell in the Perm Province  
portion of the Kama Valley. Gaz.prom. 10 no.3:1-3 '65.

(MIRA 18:5)

L 31853-65 EWT(n)/EPF(n)-2/T/EMP(l)/EMP(b) Pu-4 IJP(c) JE/JG

ACCESSION NR: AP004276

S/0126/65/019/001/0145/0147

30  
13

AUTHOR: Dykov, V. N.; Rudenko, V. A.; Zakharova, M. I.

TITLE: The redistribution of dislocations in a molybdenum single crystal by annealing

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 1, 1965, 145-147

TOPIC TAGS: dislocation redistribution, subgrain boundary, molybdenum single crystal, vacuum furnace, slip plane, subgrain fragmentation, dislocation rosette, pickling pit, vacuum annealing, lattice defect

ABSTRACT: A study has been made of the redistribution of dislocations and the formation of subgrain boundaries in the process of annealing a sample of monocrystalline molybdenum produced by electron-beam smelting. The groups of dislocations are usually arranged in the form of a dislocation "rosette," under the influence of concentrated local plastic deformations. In cast metals, local plastic deformation can be produced by the presence of submicroscopic pores which develop during the metal-cooling period. Annealing of the mentioned samples at temperatures of 1,500 and 2,000C results in a redistribution of the dislocations. Some of the latter shift to the boundaries of the subgrains and are absorbed by them. Others

Card 1/2

L 31853-65

ACCESSION NR: AP5004276

contribute to the formation of new dislocation boundaries within the subgrains. The interaction between the dislocation grids and walls located in different planes results in the fragmentation of the old subgrains into smaller blocs. The formation of new subgrain boundaries also reveals intermittent and staggered shifts of dislocations. Orig. art. has: 7 photomicrographs.

ASSOCIATION: None

SUBMITTED: 02Apr64

ENCL: 00

SUB CODE: SS

NO REF SOV: 002

OTHER: 001

Card 2/2

L 59685-65 EWT(m)/EPF(n)-2/T/EWP(t)/EWP(b)/EWA(c) Pet/Pu-4 DIAAP/IJP(c)

ACCESSION NR: AP5008785 ES/JD/WW/JG

S/0126/65/019/003/0397/0400  
532.72

AUTHOR: Pavlinov, L. V.; Bykov, V. N.

TITLE: Diffusion of carbon in  $\beta$ -zirconium

SOURCE: Fizika metallov i metallovadeniye, v. 19, no. 3, 1965, 397-400

TOPIC TAGS: zirconium, carbon, diffusion coefficient, radioactive isotope

ABSTRACT: Diffusion of carbon in the high-temperature body-centered cubic form of zirconium (99.6%) is investigated using radioactive isotope  $C^{14}$ . The diffusion of carbon in  $\beta$ -zirconium at temperatures of 900-1260°C is expressed by the equation  $D = 0.0048 \exp(-26,700/RT)$  cm<sup>2</sup>/sec. Parameters for the temperature dependence of the coefficient of carbon in zirconium ( $D_0$  and  $\Delta H$ ) agree with data on the diffusion of carbon in other body-centered metals, as well as with the values calculated according to Wert and Zener (*Phys. Rev.*, 1949, 76, 1169). The activation energy and frequency factor for the diffusion of carbon and nitrogen in zirconium are about the same as the corresponding values of self-diffusion in zirconium. The authors feel this unusual phenomenon requires further investigation.

Card 1/2

I. 53685-65

ACCESSION NR: AP5008785

ASSOCIATION: none

SUBMITTED: 02Mar64

INCL: 00

SUB CODE: *NP*, MM

NO REF SOV: 005

OTHER: 012

*BBB*  
Card 2/2

L 13825-66 EWP(m)/EPF(n)-2/EWP(t)/EWP(b) IJP(c) ES/JD/WJ/JG  
 ACC NR: AP6001793 (W) SOURCE CODE: UR/0089/65/019/006/0521/0523

AUTHOR: Pavlinov, L. V.; Nakonechnikov, A. I.; Bykov, V. N.

ORG: none

TITLE: Uranium diffusion in molybdenum, niobium, zirconium, and titanium

SOURCE: Atomnaya energiya, v. 19, no. 6, 1965, 521-523

TOPIC TAGS: uranium metal, temperature dependence, molybdenum, niobium, zirconium, titanium, metal diffusion, crystal lattice defect

ABSTRACT: Uranium diffusion in Mo, Nb, Zr, and Ti has been investigated. Diffusion coefficients were determined by measuring the integral activity of the residue using the  $\alpha$ -radiation of uranium enriched up to 90% by  $^{235}\text{U}$ . Readings were taken at 1500 — 2000C (Mo and Nb) and 915 — 1200C (Zr and Ti). The temperature dependence of the diffusion coefficient is described by the equations

$$D_{\text{Mo}}^{\text{U}} = 7.60 \cdot 10^{-3} \exp(-76400/RT) \text{ cm}^2/\text{sec.}$$

$$D_{\text{Nb}}^{\text{U}} = 8.90 \cdot 10^{-3} \exp(-76800/RT) \text{ cm}^2/\text{sec.}$$

$$D_{\text{Zr}}^{\text{U}} = 7.77 \cdot 10^{-3} \exp(-25800/RT) \text{ cm}^2/\text{sec.}$$

$$D_{\text{Ti}}^{\text{U}} = 4.90 \cdot 10^{-4} \exp(-29300/RT) \text{ cm}^2/\text{sec.}$$

Card 1/2

UDC: 621.039.542/548.526



ACC NR: AP6001793

Substantial differences between the diffusion mobility and activation energies of Mo and Nb on the one side and Zr and Ti on the other are most probably caused by crystalline lattice defects, such as the excess vacancies appearing in Ir and Ti during polymorphous transitions. Orig. art. has: 1 formula, 2 figures, and 2 tables.

SUB CODE: 11, 20 / SUBM DATE: 02Apr65 / ORIG REF: 007 / OTH REF: 006

OC  
Card 2/2

L 26632-66 EWP(e)/EWT(m)/EWP(t) IJP(c) JD/WB/WH

ACC NR: AP5025339

SOURCE CODE: UR/0126/ 65/020/003/0472/0474

AUTHOR: Bykov, V. N.; Ionov, R. A.; Rudenko, V. A.

ORG: None

TITLE: The structure of thin oxide films on iron-silicon alloy

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 3, 1965, 472-474

TOPIC TAGS: iron base alloy, silicon containing alloy, polycrystalline film, electron diffraction analysis, iron oxide, silicon dioxide

ABSTRACT: The structure of thin oxide films in the range of 1000 Å which form on the surface of iron-silicon have been studied by means of electron diffraction techniques. The alloys used in this experiment contained from 1 to 5% silicon by weight. The oxide films were formed by heating the polished flat samples in a furnace at 700°C for a period of 3 minutes. The oxide films were stripped from the surface in a solution of iodine-ethyl alcohol. The electron diffraction technique showed that only  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> was present on the surface of the sample. The analysis of oxide films formed on the surface of alloys Fe + 4% Si and Fe + 5% Si revealed in addition to  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> the presence of  $\alpha$ -cristobalite. The electron

Card 1/2

UDC: 542.943

I. 26632-66

ACC NR: AP5025339

diffraction technique did not show the presence of  $\beta$ -cristobalite since it apparently exists inside the oxide film close to the surface of the metal. When the separated oxide films were subjected to heating at 1100°C for a period of two hours the silicon oxide was transformed into  $\alpha$ -cristobalite with the crystal size of more than 200 Å. On the basis of these findings it can be concluded that the film consists of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> and SiO<sub>2</sub>. The SiO<sub>2</sub> is in a form of fine  $\alpha$ -cristobalite particles and amorphous SiO<sub>2</sub>. In the initial stage of oxidation of alloys containing a high percentage of silicon an SiO<sub>2</sub> layer is formed at the metal interface which slows down the diffusion of iron ions through the oxide layer and thus slows the rate of oxidation. Orig. art. has: 1. fig. and 1 table.

SUB CODE:11,20/ SUBM DATE: 04Sept64/ ORIG REF: 003/ OTH REF: 004

Card 2/2

L 11957-66 EWT(1)/EWT(m)/EWT(t)/EWT(b) LJP(c) JD/JG  
 ACC NR: AP5026598 SOURCE CODE: UR/0056/65/049/004/1083/1090  
 AUTHORS: <sup>44,55</sup>Golovkin, V. S.; <sup>44,55</sup>Bykov, V. N.; <sup>44,55</sup>Levdik, V. A. 63  
 ORG: None 57  
 TITLE: Anomalies in the <sup>21,44,55</sup>magnetic structure of chromium 27  
 SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 4, 1965, 1083-190  
 TOPIC TAGS: chromium, magnetic structure, line splitting, neutron diffraction, single crystal, magnetic moment, antiferromagnetism  
 ABSTRACT: This is a continuation of earlier work (Doklady AN SSSR v. 128, 1153, 1959), where the authors suggested the possible existence of a magnetic structure in chromium. To check on this hypothesis, and also in view of discrepancies in the previously published data on magnetic splitting of the neutron-diffraction peaks of chromium, the authors undertook a new investigation to confirm the existence of anomalies of a magnetic scattering by chromium. The sample was single-crystal chromium (99.96 per cent pure) grown from chromium iodide. To determine the contribution of the magnetic intensity to the superstructure sites, the intensity of the (100), (010), and (001) peaks was meas-

Card 1/2